Health Statistics & Research
Tennessee Department of Health

Traumatic Brain Injury Registry

Causes of External Injury Analysis
1996-2000

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STATE OF TENNESSEE
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INTRODUCTION

The enabling legislation establishing the Traumatic Brain Injury Registry was signed into law in May 1993. As written, the initial legislation prohibited health care providers from reporting case information without written consent of the patient. An amendment was passed in May 1996 resolving this issue. Data collection officially began with patients discharged during 1996. The hospitals report information on inpatients, with specific *International Classification of Diseases 9th Revision Clinical Modification* (ICD 9-CM) diagnosis codes, whose admission and discharge dates are different (where length of stay was 24 hours or more) and for those individuals who died from the brain injury. Patients seen in emergency rooms who were sent home the same day or length of stay was less than 24 hours are not included in the registry.

A TRAUMATIC BRAIN INJURY IS DEFINED AS AN ACQUIRED INJURY TO THE BRAIN CAUSED BY AN EXTERNAL PHYSICAL FORCE THAT MAY RESULT IN TOTAL OR PARTIAL DISABILITY OR IMPAIRMENT.

The number of traumatic brain injury cases reported to the registry has increased every year since 1996. The number of cases increased by 29.6 percent from 1996 to 2000. Some of the increase may be due to better reporting or the inclusion of the Nature of Injury Code 959.01.

Due to modifications made to the ICD-9-CM codes for traumatic brain injury, the Nature of Injury Code (959.01 Head Injury Unspecified) was included for impact surveillance in 1998. Although the injury code 959.01 should to be used for minor bumps on the head without intracranial injury, there were concerns that it would be used incorrectly. The statement “head injury” is used to describe things ranging from bumps on the head to deep coma. In 1998, 6.5 percent of the traumatic brain injuries were coded 959.01 (Head Injury Unspecified) and increased to 14.5 percent in 2000.

Percent of Traumatic Brain Injury Cases with the Cause of Injury Reported

1. Total Cases	1996	1997	1998	1999	2000
Traumatic Brain Injuries Reported	5,086	5,452	5,839	6,386	6,593
External Causes of Injury Reported	4,605	5,077	5,718	6,305	6,528
Percent of Total Number of TBI Cases	90.5	93.1	97.9	98.7	99.0
2. Tennessee Residents					
Traumatic Brain Injuries Reported	3,897	4,181	4,644	5,002	5,228
External Causes of Injury Reported	3,496	3,880	4,531	4,934	5,172
Percent of Total Number of TBI Cases	89.7	92.8	97.6	98.6	98.9

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry

Reporting the cause of injury has increased yearly, from 90.5 percent of the total cases reported in 1996 to 99.0 percent in 2000. Out-of-state residents make up approximately twenty-one percent of the total cases reported. Reporting the cause of injury for Tennessee residents increased from 89.7 percent in 1996 to 98.9 percent in 2000.

The charts and graphs presented in this report are based on an extensive review of the E-Code (External event that caused the accident). The shaded areas in the charts highlight the numbers/rates described in the accompanying narrative. The E-Code not only describes the major category that caused the accident, but where possible, presents a profile describing the accident and individual involved. For example, the two largest categories are: collision with other motor vehicles or loss of control without collision. The last digit of the E-Code determines if the injured person was the driver, passenger, motorcyclist, passenger on motorcycle, occupant of a streetcar, rider of an animal or animal–drawn vehicle, pedal cyclist or pedestrian.

The analysis of the data is a comparison of the cases and population as a percent within their respective age category. Numbers by themselves may be misleading in that the phenomena under consideration could be increasing in volume, but may be decreasing or increasing if a rate is used. Rates standardize the relationship between items being compared. This report does present some numbers, however, the basic analysis are presented as rates (percent of 100).

PERCENT OF TRAUMATIC BRAIN INJURY CASES VERSUS PERCENT OF TENNESSEE POPULATION BY AGE GROUPS 1996 to 2000

A higher percent of infants, age groups between 15 and 34 years of age, and persons 75 years old or older experienced a traumatic brain injury than the percent their age groups represented of Tennessee's population for the years 1996 through 2000. In 1998, the age group 25 to 34 represented a slightly higher percent of the population (14.5 percent) than those who experienced a traumatic brain injury (14.0 percent). In 2000, the age group between 65 and 74 years of age also had a higher percent of cases than population, 7.9 to 6.7 percent respectively.

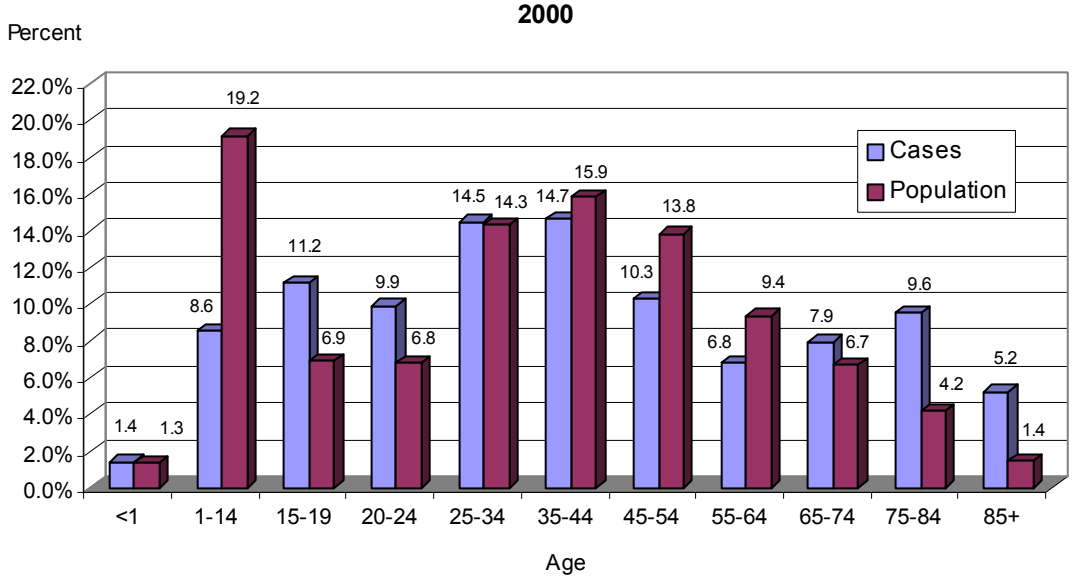
Percent of Cases versus Percent of Population in Tennessee

	1996		1997		1998		1999		2000	
Age	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population
Unknown	0.1%		0.2%		0.0%		0.0%		0.0%	
<1	2.0%	1.3%	2.2%	1.4%	2.1%	1.4%	1.7%	1.4%	1.4%	1.3%
1-14	12.0%	19.2%	11.2%	19.0%	12.0%	19.0%	9.4%	18.9%	8.6%	19.2%
15-19	12.5%	7.1%	11.7%	7.1%	12.0%	7.1%	11.6%	7.0%	11.2%	6.9%
20-24	9.2%	6.8%	8.5%	6.6%	9.1%	6.6%	9.5%	6.6%	9.9%	6.8%
25-34	15.9%	15.1%	15.7%	14.8%	14.0%	14.5%	15.3%	14.2%	14.5%	14.3%
35-44	13.8%	16.2%	14.7%	16.3%	14.0%	16.3%	13.2%	16.4%	14.7%	15.9%
45-54	9.1%	12.9%	8.8%	13.2%	9.1%	13.4%	10.2%	13.7%	10.3%	13.8%
55-64	6.0%	8.8%	6.1%	8.9%	6.7%	9.2%	6.6%	9.4%	6.8%	9.4%
65-74	6.7%	7.6%	7.2%	7.5%	7.1%	7.4%	7.1%	7.3%	7.9%	6.7%
75-84	8.3%	3.6%	8.5%	3.6%	8.4%	3.7%	9.9%	3.7%	9.6%	4.2%
85+	4.4%	1.4%	5.2%	1.4%	5.5%	1.4%	5.4%	1.4%	5.2%	1.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry

The following graph indicates that infants, age groups between 15 and 34 years of age, and persons 65 years old and older had a higher percent of total cases in relation to their percent of the total population in 2000. Example: The relationship of cases to population for infants is approximately 1 to 1 whereas the ratio for the age group 15 to 19 is 1.6 to 1.

Percent of Cases versus Percent of Population 2000



Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry

In summary, key areas of concern occur when a specific age group's percent of cases is larger than their respective percent of the population. This occurrence is evidenced in the age groups 15 to 34 years old. One of the primary reasons for the larger percent of cases than the group represents of the population is due to traffic accidents.

TENNESSEE RESIDENTS WITH A TRAUMATIC BRAIN INJURY DUE TO MOTOR VEHICLE TRAFFIC ACCIDENTS BY AGE GROUPS 1996 - 2000

A higher percent of traumatic brain injuries within motor vehicle traffic accidents occurred in age groups between 15 and 34 years of age than the percent their age groups represented of the total population from 1996 through 2000. This was also true for the 75 to 84 year old age group between 1996 and 1999 and the 35 to 44 year old age group in 2000.

Percent of Motor Vehicle Traffic Accidents versus Percent of Population in Tennessee

	1996		1997		1998		1999		2000	
Age	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population
Unknown	0.1%		0.3%		0.0%		0.0%		0.0%	
<1	0.9%	1.3%	0.4%	1.4%	0.7%	1.4%	0.2%	1.4%	0.5%	1.3%
1-14	11.0%	19.2%	9.4%	19.0%	10.9%	19.0%	8.0%	18.9%	6.8%	19.2%
15-19	18.6%	7.1%	17.1%	7.1%	17.8%	7.1%	17.2%	7.0%	16.4%	6.9%
20-24	12.0%	6.8%	11.9%	6.6%	13.1%	6.6%	13.3%	6.6%	14.8%	6.8%
25-34	19.3%	15.1%	19.9%	14.8%	17.0%	14.5%	19.0%	14.2%	18.7%	14.3%
35-44	13.3%	16.2%	15.7%	16.3%	15.4%	16.3%	15.2%	16.4%	16.5%	15.9%
45-54	9.3%	12.9%	9.0%	13.2%	9.1%	13.4%	10.4%	13.7%	9.9%	13.8%
55-64	4.8%	8.8%	5.2%	8.9%	6.0%	9.2%	5.9%	9.4%	5.7%	9.4%
65-74	5.4%	7.6%	5.2%	7.5%	4.8%	7.4%	4.8%	7.3%	5.9%	6.7%
75-84	4.0%	3.6%	4.6%	3.6%	4.2%	3.7%	4.7%	3.7%	3.9%	4.2%
85+	1.3%	1.4%	1.2%	1.4%	1.1%	1.4%	1.2%	1.4%	0.9%	1.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

From 1996 to 2000, persons 15 to 19 years old were approximately 7 percent of the total population in Tennessee but accounted for over 16 percent of the traumatic brain injuries due to a motor vehicle traffic accident. Of the 2,697 persons 15 to 19 years old who suffered a traumatic brain injury between 1996 and 2000, approximately 75 percent resulted from a motor vehicle traffic accident. (See table on page 7.)

Persons 20 to 24 years of age made up 6.8 percent of the population in 1996 and remained fairly stable through 2000. The percent of traumatic brain injuries within motor vehicle traffic accidents in the 20 to 24 year old age group ranged from 12.0 in 1996, with a slight decrease to 11.9 percent in 1997, to a high of 14.8 percent in 2000. Of the 2,129 persons 20 to 24 years old who suffered a traumatic brain injury between 1996 and 2000, approximately 72 percent resulted from a motor vehicle traffic accident.

Persons 25 to 34 years of age made up 15.1 percent of the population in 1996 and declined gradually to 14.3 percent in 2000. From 1996 to 2000, the lowest percent of traumatic brain injury cases for this group was 17 percent in 1998 and the highest percent was 19.9 percent in 1997. Of the 3,448 persons 25 to 34 years old who suffered a traumatic brain injury between 1996 and 2000, approximately 63 percent resulted from a motor vehicle traffic accident.

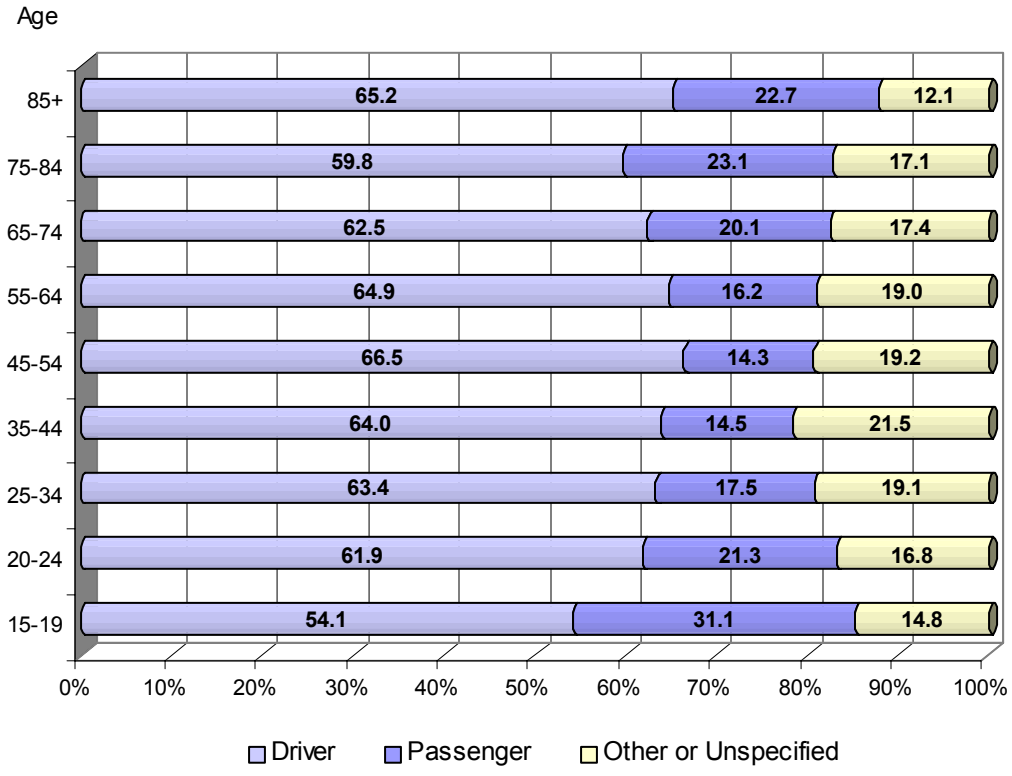
The percent of total population for persons 75 to 84 years old was 3.6 percent in 1996 and increased slightly to 4.2 percent by 2000. The percent of traumatic brain injury cases for this age group within motor vehicle traffic accidents was slightly higher ranging from 4.0 percent in 1996 to 4.7 percent in 1999. In 2000, the percent of total population (4.2 percent) for the 75 to 84 year old age group was higher than the percent of traumatic brain injury cases due to a motor vehicle traffic accident (3.9 percent). Approximately 25 percent of the traumatic brain injuries suffered by persons 75 to 84 years old, between 1996 and 2000, were due to motor

vehicle traffic accidents. From 1996 to 2000, approximately 60 percent of the 497 persons in this group were driving when injured, approximately 23 percent were identified as passengers and approximately 17 percent were other or unspecified.

The 5th digit of the external cause of injury code for motor vehicle traffic accidents identifies the injured person. The percent of persons injured in motor vehicle accidents and identified as the driver during the five-year period, increased by age group from 54.1 percent for persons 15 to19 years of age to 66.5 percent for persons 45 to 54 years of age. The percent of persons 55 to 64 years of age injured in motor vehicle accidents and identified as the driver decreased to 64.9 percent. Injured persons 75 to 84 years old had 59.8 percent identified as the driver. Persons over 85 years old injured in a motor vehicle accident had 65.2 percent identified as the driver.

The age group with the highest percent of persons injured in a motor vehicle accident identified as a passenger was teenagers (15 to 19 years old) at 31.1 percent. The percent of injured persons identified as a passenger decreased for each age group to a low of 14.3 percent for persons 45 to 54 years of age. The percent then gradually increased to a high of 23.1 percent for persons 75 to 84 years old. Persons over 85 years old injured in a motor vehicle accident had 22.7 percent identified as the passenger.

Motor Vehicle Traffic Accidents by Person Injured for Tennessee Residents 15 and Older 1996-2000



Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

Motor vehicle accidents within the 15 to 19 year old age group were approximately 3 times higher than for persons within the 75 to 84 age group. Eight percent more teenagers (15 to 19 years of age) were injured as passengers (31 percent) in a motor vehicle accident, than persons in the 75 to 84 year old age group (23 percent). The percent of drivers in the 75 to 84 year old age group (60 percent) injured was approximately 6 percent higher than for teenage drivers (54 percent).

Percent of Motor Vehicle Accidents Within Age Groups
1996-2000

Age Group	Total Injured	Motor Vehicle Traffic Accidents	Percent from Motor Vehicle Traffic Accidents
<1	430	61	14.2%
1-14	2,412	1,052	43.6%
15-19	2,697	2,017	74.8%
20-24	2,129	1,526	71.7%
25-34	3,448	2,178	63.2%
35-44	3,224	1,781	55.2%
45-54	2,196	1,112	50.6%
55-64	1,484	649	43.7%
65-74	1,666	608	36.5%
75-84	1,967	497	25.3%
85+	1,190	132	11.1%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

Sixty-three (63) to 75 percent of the traumatic brain injuries sustained by the age groups between 15 and 34 years old, are the result of a motor vehicle accident. Accident prevention programs should be directed at these highly visible age groups.

TENNESSEE RESIDENTS WITH A TRAUMATIC BRAIN INJURY DUE TO ACCIDENTAL FALLS BY AGE GROUPS 1996 - 2000

A higher percent of traumatic brain injuries within accidental falls occurred for infants and persons over 64 years old than the percent they represented of Tennessee's population. From 1996 to 2000, persons 1 to 64 years of age had a lower percent of traumatic brain injuries within accidental falls than the percent they represented of Tennessee's population, except for persons 55 to 64 years of age in 1996.

Percent of Accidental Falls versus Percent of Population in Tennessee

	1996		1997		1998		1999		2000	
Age	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population
Unknown	0.1%		0.0%		0.0%		0.0%		0.0%	
<1	3.7%	1.3%	4.9%	1.4%	3.6%	1.4%	3.2%	1.4%	2.1%	1.3%
1-14	11.1%	19.2%	11.4%	19.0%	11.6%	19.0%	7.8%	18.9%	7.3%	19.2%
15-19	2.7%	7.1%	2.7%	7.1%	2.3%	7.1%	1.9%	7.0%	2.0%	6.9%
20-24	3.1%	6.8%	1.8%	6.6%	1.6%	6.6%	1.9%	6.6%	1.8%	6.8%
25-34	6.6%	15.1%	4.7%	14.8%	4.6%	14.8%	5.3%	14.2%	4.5%	14.3%
35-44	8.4%	16.2%	8.7%	16.3%	8.5%	16.3%	6.1%	16.4%	8.0%	15.9%
45-54	8.4%	12.9%	7.6%	13.2%	7.6%	13.2%	8.9%	13.7%	9.7%	13.8%
55-64	10.2%	8.8%	8.2%	8.9%	8.5%	8.9%	9.3%	9.4%	9.4%	9.4%
65-74	10.7%	7.6%	13.3%	7.5%	13.2%	7.5%	13.3%	7.3%	14.3%	6.7%
75-84	20.2%	3.6%	21.1%	3.6%	20.8%	3.6%	25.4%	3.7%	24.7%	4.2%
85+	15.0%	1.4%	15.9%	1.4%	17.8%	1.4%	16.9%	1.4%	16.0%	1.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain injury Registry.

Infants accounted for approximately 1.3 to 1.4 percent of the total population since 1996. The percent of traumatic brain injury cases reported for infants within accidental falls ranged from a low of 2.1 percent in 2000, to a high of 4.9 percent in 1997. Approximately 43 percent of the traumatic brain injuries suffered by infants between 1996 and 2000 were due to falls.

Persons 65 to 74 years of age made up 7.6 percent of the population in 1996 and declined to 6.7 percent in 2000. Although the percent of population declined slightly from 1996 to 2000, the percent of traumatic brain injury cases within accidental falls was 10.7 percent in 1996 and increased to 14.3 percent in 2000.

The percent of total population for persons 75 to 84 years old was 3.6 percent in 1996 and increased slightly to 4.2 percent in 2000. This group had the highest percent of cases reported for accidental falls. From 1996 through 1998, the percent of traumatic brain injury cases within accidental falls for persons 75 to 84 years old ranged between 20 and 21 percent. In 1999, the percent of cases within falls increased to 25.4 percent, then declined slightly to 24.7 percent in 2000.

From 1996 to 2000, persons over 84 years old were 1.4 percent of the total population in Tennessee. This age group accounted for over 15 percent of the traumatic brain injuries within accidental falls in 1996, increased to 17.8 percent by 1998, declined in 1999 to 16.9 percent and to 16.0 percent in 2000.

Percent of Accidental Falls Within Age Groups 1996-2000

Age Group	Total Injured	Accidental Falls	Percent from Falls
<1	430	193	43.1%
1-14	2,412	549	22.6%
15-19	2,697	129	4.8%
20-24	2,129	113	5.3%
25-34	3,448	290	8.4%
35-44	3,224	450	14.0%
45-54	2,196	489	22.3%
55-64	1,484	521	35.2%
65-74	1,666	754	45.3%
75-84	2,067	1,305	63.2%
85+	1,190	940	78.9%

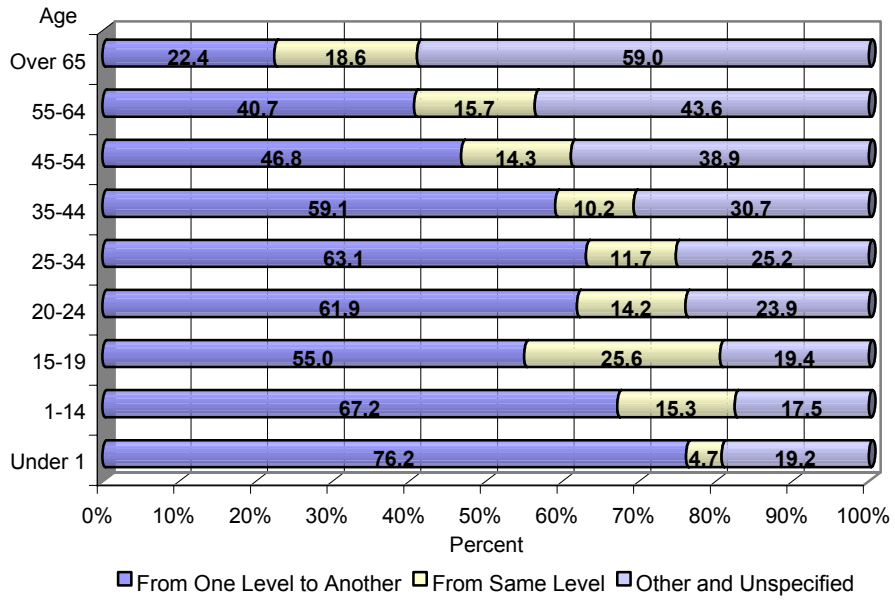
Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

Injury prevention is a primary objective in reducing traumatic brain injuries. Falls, while a problem for all age groups, represent a disproportionate problem for infants and the elderly. Approximately 43 percent of the total traumatic brain injuries for infants were due to falls. For persons 75 to 84 years old 63.2 percent of the total brain injuries were due to falls. The percent of brain injuries due to falls increased to 78.9 percent for person over 85 years old.

Approximately 76 percent of the falls experienced by infants sustaining a traumatic brain injury were from one level to another such as falling from a bed. A fall on the same level, for example, from slipping, tripping, or stumbling accounted for 4.7 percent of the accidental falls causing a traumatic brain injury to infants. Approximately 19 percent were other or unspecified falls.

Approximately 22 percent of the falls experienced by persons 65 years old and older sustaining a traumatic brain injury were from one level to another, such as falling from stairs. A fall on the same level for example from slipping, tripping, or stumbling accounted for 18.6 percent of the accidental falls causing a traumatic brain injury to persons 65 years old and older. Fifty-nine percent of the falls were other or unspecified falls. Of the 4,923 persons 65 years old and older who suffered a traumatic brain injury between 1996 and 2000, approximately 61 percent resulted from a fall.

Type of Fall 1996-2000



Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

TENNESSEE RESIDENTS WITH A TRAUMATIC BRAIN INJURY DUE TO HOMICIDES AND INJURIES PURPOSELY INFLICTED BY OTHER PERSONS BY AGE GROUPS 1996 - 2000

From 1996 through 2000, a higher percent of traumatic brain injuries within homicides and injuries purposely inflicted by other persons occurred in infants and age groups between 20 and 44 years of age, than the percent their age groups represented of the total population. This is also true for persons 15 to 19 years of age for 1996, 1997 and 2000 and 45 to 54 years of age in 1998 and 2000.

Percent of Homicide vs Percent of Population in Tennessee

	1996		1997		1998		1999		2000	
Age	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population
Unknown	0.0%		0.0%		0.0%		0.0%		0.0%	
<1	4.6%	1.3%	4.5%	1.4%	5.5%	1.4%	6.0%	1.4%	6.4%	1.3%
1-14	3.1%	19.2%	3.3%	19.0%	4.6%	19.0%	3.3%	18.9%	2.6%	19.2%
15-19	10.4%	7.1%	10.3%	7.1%	6.6%	7.1%	5.7%	7.0%	7.0%	6.9%
20-24	10.7%	6.8%	10.6%	6.6%	12.7%	6.6%	12.5%	6.6%	11.5%	6.8%
25-34	20.6%	15.1%	24.5%	14.8%	24.6%	14.8%	25.0%	14.2%	23.3%	14.3%
35-44	30.1%	16.2%	25.8%	16.3%	22.8%	16.3%	25.3%	16.4%	26.5%	15.9%
45-54	12.0%	12.9%	11.8%	13.2%	15.0%	13.2%	13.3%	13.7%	14.7%	13.8%
55-64	4.3%	8.8%	5.2%	8.9%	3.5%	8.9%	4.1%	9.4%	3.8%	9.4%
65-74	2.8%	7.6%	1.8%	7.5%	2.6%	7.5%	2.7%	7.3%	1.6%	6.7%
75-84	1.2%	3.6%	1.8%	3.6%	1.2%	3.6%	1.4%	3.7%	1.6%	4.2%
85+	0.3%	1.4%	0.3%	1.4%	0.9%	1.4%	0.8%	1.4%	1.0%	1.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

Infants accounted for 1.3 to 1.4 percent of the total population, but accounted for 4.5 to 6.4 percent of traumatic brain injuries within homicides and injuries purposely inflicted by other persons, from 1996 through 2000.

Children, 1 to 14 years old, accounted for approximately 19 percent of the population during the five-year period. Traumatic brain injuries within homicides and injuries purposely inflicted by other persons ranged from a high of 4.6 percent in 1998, to a low of 2.6 percent in 2000.

Teenagers, 15 to 19 years old, made up approximately 7 percent of Tennessee's population from 1996 through 2000. In 1996 and 1997, teenagers accounted for approximately 10 percent of traumatic brain injuries within homicides and injuries purposely inflicted by other persons. In 1999, the percent of teenagers in this age group reported to have experienced a traumatic brain injury within homicides and injuries purposely inflicted by other persons dropped to 5.7 percent but increased to 7.0 percent in 2000.

Persons 20 to 24 years of age stayed between 6.6 and 6.8 percent of Tennessee's population from 1996 through 2000. Traumatic brain injuries within homicides and injuries purposely inflicted by other persons ranged from a low of 10.6 percent in 1997, to a high of 12.7 percent in 1998, during the five-year period.

Persons 25 to 44 years old accounted for approximately 30 percent of the population, but approximately 50 percent of traumatic brain injuries within homicides and injuries purposely inflicted by other persons from 1996 through 2000.

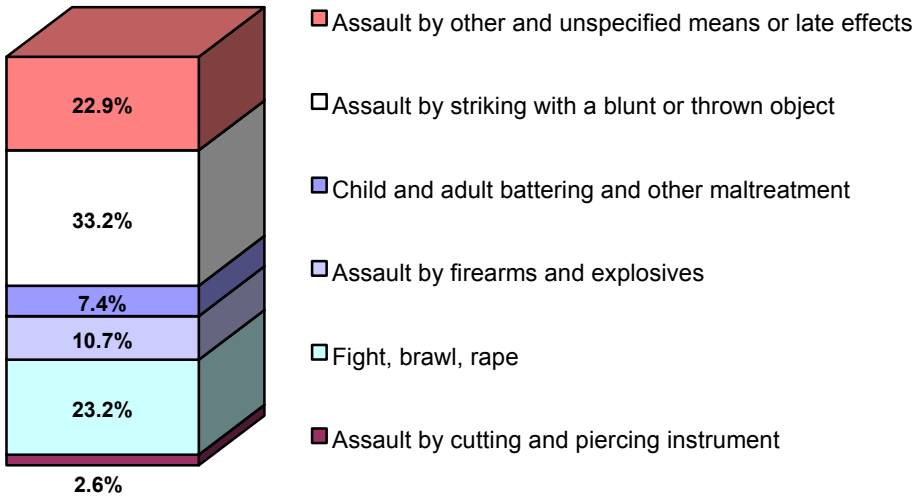
The percent of Tennessee's population in 1996 was 12.9 percent for persons 45 to 54 years of age and gradually increased to 13.8 percent in 2000. In this age group the percent of traumatic brain injuries within homicides and injuries purposely inflicted by other persons was below the percent of population in 1996, 1997 and 1999 (12.0, 11.8 and 13.3 respectively). The percent of traumatic brain injuries within homicides and injuries purposely inflicted by other persons increased to 15 percent in 1998, slightly above the percent of population (13.2 percent). By 2000, the percent of cases decreased to 14.7 percent, but was still slightly above the percent population (13.8 percent).

Persons 55 years old or older made up 21 to 22 percent of the population during the five year period but accounted for 8 to 9 percent of the traumatic brain injury cases within homicides and injuries purposely inflicted by other persons.

Brain injuries due to homicides and injuries purposely inflicted by others is a societal problem regardless of the age group involved. A review of the table on page 10 reveals that infants and persons between the ages of 15 and 44 are at a higher risk of receiving a brain injury from violence. These age groups represent a greater percent of the cases than they represent of the population.

The following graph shows the main causes of homicide or types of assault resulting in a traumatic brain injury. **The data in the chart follows the same order as the legend.**

Homicide and Injury Purposely inflicted by Other Persons
Resulting in a Traumatic Brain Injury
1996 - 2000



Source: Tennessee Department of Health, Health Statistic and Research, Traumatic Brain Injury Registry.

Of the 134 teenagers (15 to 19 years old), who suffered a traumatic brain injury due to homicide and injury purposely inflicted by another person between 1996 and 2000, 26.9 percent were due to an assault by firearms or explosives. Approximately 28.4 percent of the brain injuries were caused by a fight or brawl, 26.9 were caused by striking with a blunt or thrown object and 17.8 percent were from the remaining three categories.

Percent of Homicides and Injuries Purposely Inflicted by Other Persons Within Age Groups 1996-2000

Age Group	Total Injured	Homicides	Percent from Homicides
<1	448	91	20.3%
1-14	2419	57	2.4%
15-19	2692	134	5.0%
20-24	2124	196	9.2%
25-34	3442	398	11.6%
35-44	3223	438	13.6%
45-54	2195	225	10.3%
55-64	1480	70	4.7%
65-74	1664	39	2.3%
75-84	2066	24	1.2%
85+	1192	11	0.9%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

Percent by Cause of Injury Within Age Groups 1996-2000

	Under 1	1-14	15-19	20-24	25-34	35-44	45-54	55-64	Over 64
Fight, brawl, rape	5.5%	29.8%	28.4%	19.4%	24.4%	22.8%	23.1%	28.6%	32.4%
Assault by firearms and explosives	1.1%	5.3%	26.9%	16.8%	10.8%	7.3%	9.3%	10.0%	5.4%
Assault by cutting or piercing instrument	0.0%	1.8%	0.7%	3.1%	4.0%	3.0%	1.3%	2.9%	2.7%
Child and adult battering and other maltreatment	86.8%	40.4%	0.7%	0.0%	1.3%	1.8%	2.7%	2.9%	1.4%
Assault by striking with a blunt or thrown object	3.3%	15.8%	26.9%	38.3%	35.7%	38.4%	37.3%	31.4%	25.7%
Assault by other and unspecified means or late effects	3.3%	7.0%	16.4%	22.4%	23.9%	26.7%	26.2%	24.3%	32.4%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry

Approximately 19 percent of the 196 persons, 20 to 24 years of age, suffering a traumatic brain injury, due to homicide and injury purposely inflicted by another person, between 1996 and 2000, were caused by a fight or brawl. Assault by striking with a blunt or thrown object accounted for 38.3 percent and firearms or explosives for 16.8 percent of the brain injuries.

Of the 398 persons 25 to 34 years of age, who suffered a traumatic brain injury, due to homicide and injury purposely inflicted by another person between 1996 and 2000, 10.8 percent were due to an assault by firearms or explosives. Striking with a blunt or thrown object accounted for 35.7 percent of the brain injuries and 24.4 were caused by a fight or brawl.

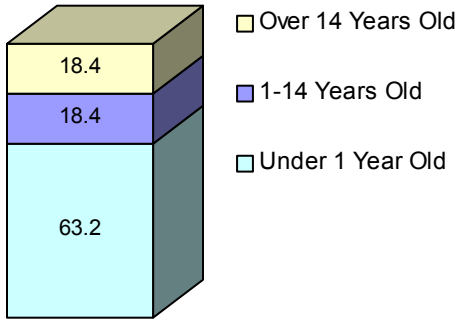
Of the 438 persons 35 to 44 years of age, who suffered a traumatic brain injury, due to homicide and injury purposely inflicted by another person between 1996 and 2000, 7.3 percent were due to an assault by firearms or explosives. A fight or brawl accounted for 22.8 percent and striking with a blunt or thrown object was 38.4 percent of the brain injuries.

Assault by striking with a blunt or thrown object accounted for 37.3 percent of the 225 persons who suffered a traumatic brain injury in the 45 to 54 year old age group. A fight or brawl accounted for 23.1 percent of the brain injuries and 9.3 percent were due to assault by firearms or explosives.

For persons 55 to 64 years of age, 31.4 percent of the 70 persons, who suffered a traumatic brain injury, were due to assault by striking with a blunt or thrown object. Ten percent of the traumatic brain injuries were due to assault by firearms or explosives and 28.6 percent were due to a fight or brawl.

Of the 74 persons over 64 years old, who suffered a traumatic brain injury, due to homicide and injury purposely inflicted by another person between 1996 and 2000, 32.4 percent were due to a fight or brawl. Assault by firearms and explosives accounted for 5.4 percent and striking with a blunt or thrown object was 25.7 percent of the brain injuries. **The data in the charts follows the same order as the legend.**

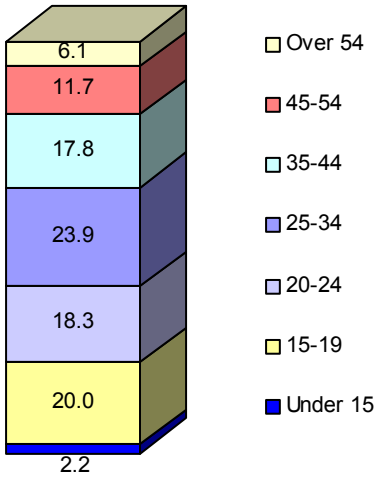
Child and Adult Battering and Other Maltreatment by Age 1996-2000



Between 1996 and 2000, 20.3 percent of the 448 infants who received a traumatic brain injury were due to homicides or injuries purposely inflicted by other persons. Infants accounted for 63.2 percent of all persons with the cause of injury reported as child and adult battering and other maltreatment.

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

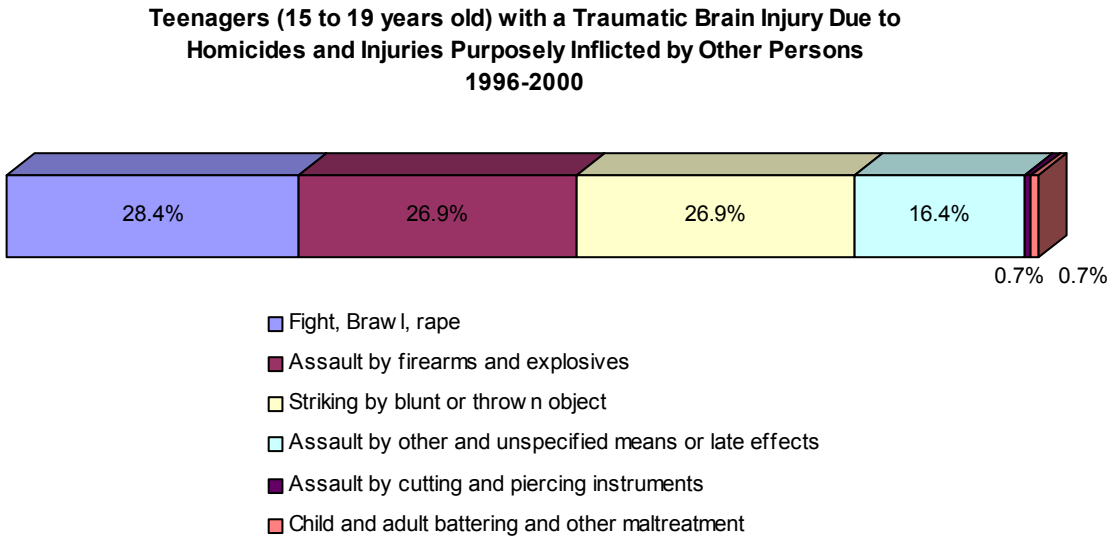
Assualt by Firearms and Explosives by Age



Teenagers (15 to 19 years old) were 20 percent of all traumatic brain injuries due to assaults by firearms or explosives. Eighty percent of the brain injuries due to assault by firearms and explosives occur in the age groups between 15 and 44 years old.

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

The data in the chart follows the same order as the legend.



Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

TENNESSEE RESIDENTS WITH A TRAUMATIC BRAIN INJURY DUE TO PEDAL CYCLE ACCIDENT BY AGE GROUPS 1996 - 2000

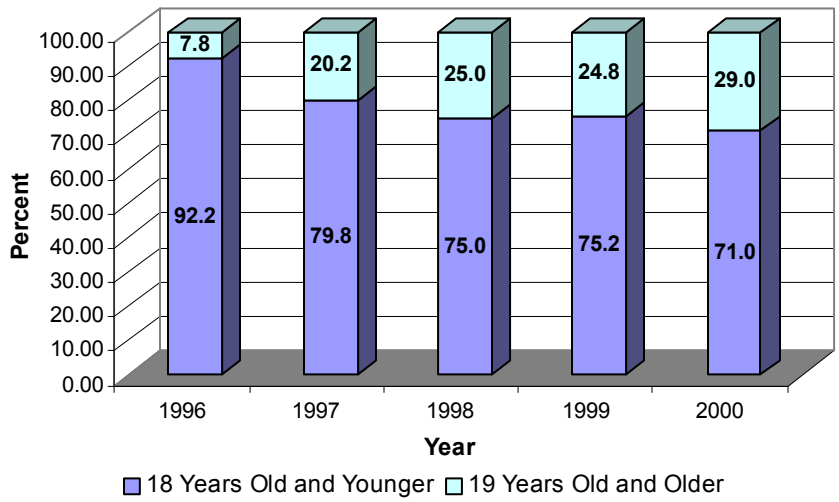
From 1996 to 2000, people between 5 and 16 years old made up approximately 17 percent of Tennessee's population. A higher percent of traumatic brain injuries within pedal cycle accidents were reported for people between 5 and 16 years of age than the percent their age group represented of the total population. In 1996, approximately 85 percent of the total pedal cycle accidents resulting in a traumatic brain injury occurred in this age group. By 2000, the percent of pedal cycle accidents resulting in a traumatic brain injury for persons 5 to 16 years old dropped to 65 percent. This decline may be attributed to increased safety education and the use of helmets. The number of pedal cycle accidents reported to the registry increased 30 percent from 1996 to 2000.

Percent of Pedal Cycle Injuries vs Percent of Population in Tennessee 1996-2000

	1996		1997		1998		1999		2000	
Age	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population
<4	3.9%	6.8%	3.4%	6.7%	3.4%	6.7%	3.8%	6.7%	5.0%	6.6%
5-6	10.4%	2.8%	7.9%	2.8%	9.1%	2.8%	10.5%	2.7%	11.0%	2.7%
7-8	16.9%	2.7%	12.4%	2.7%	14.8%	2.7%	12.4%	2.7%	10.0%	2.8%
9-10	14.3%	2.7%	19.1%	2.7%	12.5%	2.8%	18.1%	2.8%	13.0%	2.9%
11-12	22.1%	2.7%	14.6%	2.7%	15.9%	2.7%	15.2%	2.7%	16.0%	2.8%
13-14	15.6%	2.8%	15.7%	2.7%	11.4%	2.7%	8.6%	2.7%	10.0%	2.7%
15-16	5.2%	2.9%	3.4%	2.8%	6.8%	2.8%	4.8%	2.7%	5.0%	2.7%
17-18	3.9%	2.8%	3.4%	2.9%	1.1%	2.9%	1.9%	2.8%	1.0%	2.8%
19-24	1.3%	13.9%	3.4%	13.8%	2.3%	13.7%	5.7%	13.6%	4.0%	8.3%
25-34	1.3%	15.1%	2.2%	14.8%	8.0%	14.5%	1.9%	14.2%	9.0%	14.3%
35-44	0.0%	16.2%	9.0%	16.3%	3.4%	16.3%	5.7%	16.4%	5.0%	15.9%
45-54	5.2%	12.9%	3.4%	13.2%	4.5%	13.4%	8.6%	13.7%	7.0%	13.8%
55-64	0.0%	8.8%	2.2%	8.9%	5.7%	9.2%	1.0%	9.4%	4.0%	9.4%
65+	0.0%	12.6%	0.0%	12.5%	1.1%	12.5%	1.9%	12.4%	0.0%	12.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.

Percent of Tennessee Residents with a Traumatic Brain Injury Due to Pedal Cycle Accidents by Age Group 1996-2000



Source: Tennessee Department of Health, Health Statistics and Research, Traumatic Brain Injury Registry.